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## (54) IMPROVEMENTS IN OPEN-AIR PLAYING SURFACES

(71) I, ARTHUR DÖRFER, a German citizen of D-694, Weinheim, Haydnstrasse 13, Germany, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to improvements in hard, rolled open-air surfaces, such as hard tennis courts, i.e. surfaces which are exposed to the elements and in particular to rain, and which are prepared by pouring an aggregate containing sand in the form of a layer forming the surface, rolling the layer, and permitting the same to set.

Conventional aggregates for such hard surfaces consist essentially of gravel, sand and ground brick. The aggregate is permitted to set and rolled to form a hard playing surface. If the subsoil is water-impermeable, the aggregate is poured over a foundation layer of coarse particulate material, such as crushed rocks, blast furnace slag, coke or mixture of such or like mineral materials.

It has been proposed to improve the water adsorptivity of such playing fields by adding alumina, clay or chalk powder to the aggregate of the playing field surface and/or the foundation layer. In this manner, a considerable amount of water may be rapidly adsorbed so that the playing field will retain a high quality after rain or other precipitation.

However, the water adsorptive media heretofore used in hard playing fields have been found to have insufficient absorptivity for water to produce the desired quality courts and also have other disadvantages.

Clay, fire brick and chalk are washed out of the playing field surface under a heavy downpour of rain and form a moist sediment layer impermeable to water under

the surface. Thus, they lose their effectiveness and destroy the adsorptivity of the surface and the foundation layer, if any.

It is the primary object of this invention to overcome these disadvantages and to provide a hard surface, such as a playing field, of high quality requiring little maintenance under inclement weather conditions and which is relatively dry in a short time after rain.

The above object is accomplished in accordance with the invention and the method of preparing the hard surface is simplified and improved. According to one aspect of the present invention there is provided a method for producing a surface of a hard open-air area including the steps of pouring a sand-containing aggregate in the form of a layer to form the surface, rolling the layer and allowing the same to set, there being finely distributed throughout the aggregate from 5 to 30% by weight calculated as silicon dioxide and based on the total weight of aggregate, of a granular, active, adsorptive silica-containing constituent in the form of silica gel or vermiculite, before the layer is rolled and permitted to set, whereby the moisture-absorbing quality of the surface is improved.

According to a further aspect of the present invention there is provided a hard, rolled open-air surface comprising a set aggregate containing sand and from 5 to 30% by weight calculated as silicon dioxide and based on the total weight of aggregate, of a granular, active, adsorptive silica-containing constituent in the form of silica gel or vermiculite, finely distributed throughout the aggregates of the foundation and/or surface layers.

The silica gel or vermiculite is not washed out of the layer when the same is subjected to rain or artificial wetting.

According to one embodiment of the present invention, up to 30% by weight, of

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the silica gel or vermiculite may also be added to the foundation layer of coarse particulate material if the latter is used.

The silica gel or vermiculite used according to the invention preferably contributes at least 5% by weight of silica to the foundation layer.

The grain size of the silica gel or vermiculite is preferably not less than five microns and should not exceed four millimeters.

Silica gel is a colorless granular mass which is hard as glass and has ultra-microscopic pores imparting to the mass a high surface area. Vermiculite, as described in U.S. patent No. 2,509,315, is mica produced by loss of alkali and addition of water and heat treated to produce a high water adsorptive capacity. Typically, vermiculite contains about 39% silicon dioxide.

These materials are mechanically solid, rather hard and have a very high water adsorptivity. For instance, silica gel adsorbs up to about 20% of its own weight of water. In contrast to the known water-adsorbing additives, they are not washed out, do not swell and do not form water-impermeable sedimentation layers which form cracks when dried, transform the playing surface into sponge-like structure under heavy rain, and cause pools of water to form on the field.

Experience has shown that playing fields containing silica gel or vermiculite in the aggregate do not have the silica washed out of the fields when subjected to heavy wetting and no pools of water are formed thereon even when the fields are saturated with water. On the other hand, under prolonged dry conditions, the quality of the court may be brought to the desired point by slightly wetting the same from time to time.

Addition of an equivalent of up to 10%, by weight, of silica will usually suffice to attain the desired elasticity and freedom from dust under slight wetting conditions. An equivalent of about 25%, by weight, of the silica will be used when it is desired to make the field usable even under heavy precipitation. The higher additive percentage will be used in the playing field surface particularly if the subsoil is impermeable or almost impermeable to water.

In hard tennis courts, it has been found particularly advantageous to keep the grain size of the silica gel or vermiculite between about five and 30 microns.

The invention may be illustrated with reference to the following non-limiting examples.

#### Example 1

A hard-court was prepared in a conventional way, using as the aggregate a

composition of the form 25% "silicaquest" (silica gel), by weight

15% washed fine gravel

60% fine grain sand

#### Example 2

A hard-court was prepared in a conventional way using as the aggregate a composition of the form

35% vermiculite, by weight

20% washed fine gravel

45% fine grain sand.

#### WHAT WE CLAIM IS:—

1. A method for producing a surface of a hard open-air area including the steps of pouring a sand-containing aggregate in the form of a layer to form the surface, rolling the layer and allowing the same to set, there being finely distributed throughout the aggregate from 5 to 30% by weight calculated as silicon dioxide and based on the total weight of aggregate, of a granular, active, adsorptive silica-containing constituent in the form of silica gel or vermiculite, before the layer is rolled and permitted to set, whereby the moisture-adsorbing quality of the surface is improved.

2. A method as claimed in claim 1 in which the grain size of the silica-containing constituent is between 5 and 4000 microns.

3. A method as claimed in claim 1 or claim 2 wherein the aggregate is poured over a foundation layer of coarse particulate material.

4. A method as claimed in claim 3 in which up to 30% by weight, based on the total weight of the foundation layer, of a granular, active, adsorptive silica-containing constituent is incorporated into the foundation layer.

5. A method as claimed in claim 4 wherein the silica-containing constituent is silica gel or vermiculite.

6. A method as claimed in claim 5 in which the vermiculite is rich in silica and contributes at least 5% by weight of silica to the foundation layer.

7. A method as claimed in claim 1 substantially as herein described.

8. A hard, rolled open-air surface comprising a set aggregate containing sand and from 5 to 30% by weight, calculated as silicon dioxide and based on the total weight of aggregate, of a granular, active, adsorptive silica-containing constituent in the form of silica gel or vermiculite, finely distributed throughout the aggregates of the foundation and/or surface layers.

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